

11  
CLAIMS

What is claimed is:

1. An intensity modulated radiation therapy (IMRT) system comprising:
  - a radiation beam delivery device positionable in a plurality of spatial orientations;
  - an IMRT control system adapted to modulate at least an intensity of a radiation beam emanating from said radiation beam delivery device depending on at least one of the spatial orientations of said radiation beam delivery device and in accordance with an IMRT intensity map; and
  - a multilayer multileaf collimator placed in a path of the radiation beam emanating from said radiation beam delivery device, said multilayer multileaf collimator comprising a plurality of layers of radiation blocking leaves, said layers being at different positions along said path of the radiation beam generally traverse to the radiation beam.
2. The system according to claim 1, wherein said multilayer multileaf collimator comprises a plurality of x-leaves of a first layer in a longitudinal direction, and a plurality of y-leaves of a second layer in a cross-over direction angled with respect to said longitudinal direction at an angle in a range of 0 to 90 degrees inclusive.
3. The system according to claim 2, wherein columns and rows of said IMRT intensity map (IM) correspond to widths of said y-leaves and x-leaves, respectively.
4. The system according to claim 3, wherein an IM cell is defined as the intersection of one of said columns and rows, the radiation beam emanating from said radiation beam delivery device passing through said IM cell, and radiation to the IM cell is selectively blocked by said y-leaves and x-leaves.
5. The system according to claim 1, wherein said radiation beam delivery device is rotatable about a longitudinal axis by a motor and said leaves are movable by at least one actuator, and said IMRT control system is operative to control operation of said motor and said at least one actuator.
6. A method for preparing a system to perform intensity modulated radiation therapy (IMRT), the method comprising:
  - providing a radiation beam delivery device positionable in a plurality of spatial orientations, and capable of delivering a radiation beam in accordance with an IMRT intensity map; and
  - providing a multilayer multileaf collimator in a path of the radiation beam emanating from said radiation beam delivery device, said multilayer multileaf collimator

comprising a plurality of layers of radiation blocking leaves, said layers being at different positions along said path of the radiation beam generally traverse to the radiation beam.

7. The method according to claim 6, further comprising delivering an intensity modulated radiation beam through an aperture defined by spacing between leaves of layers of said multilayer multileaf collimator.